

Larisa E. Harding

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EDUCATION

2008. **Doctor of Philosophy.** Department of Biology, University of New Mexico (UNM), Albuquerque, New Mexico (NM). Dissertation title—“Out of the Americas: a biogeographical history of the American *Mustela*.” Advisors: Terry L. Yates, Felisa A. Smith
2000. **Master of Science.** Department of Zoology; Zoology, Ecology and Systematics Division, Brigham Young University (BYU), Provo, Utah (UT). Thesis title—“Differential habitat utilization, movement patterns, and behavior of the American Black Bear from hound transects on the East Tavaputs Plateau, UT.” Advisor: Hal L. Black
1998. **Bachelor of Science, Conservation Biology.** Department of Zoology, BYU, Provo, UT. Wildlife biology emphasis.

CURRENT POSITION

Terrestrial Research Program Manager, AZ Game and Fish Department, Phoenix, AZ. Supervise and coordinate staff of wildlife specialists engaged in complex wildlife studies/management and lead research projects to completion. Develop and coordinate wildlife and habitat management techniques, plans, and recommendations, conduct field research, review and prepare technical, popular and scientific publications.

RESEARCH INTERESTS

Historical biogeography and phylogeography; climate change impacts on species persistence over time and space; functional and genetic drivers of biodiversity and their sustaining influences, dynamics of disease ecology and transmission, phenotypic plasticity; natural history, ecology and evolution of vertebrates and their environments.

PROFESSIONAL EXPERIENCE

- 2010-2012 **Post-doctoral Research Fellow**, Landscape Ecology, Department of Ecology and Environmental Sciences, Umeå University, Sweden. Projects highlighted the evolutionary processes and genetic patterns stimulating biological diversity in vertebrates at multiple scales across time and space, e.g., the biogeographical and ecological effects of past climate change on genetic diversity and distributions of modern species, using ArcGIS, MaxENT, and ecological species distribution models. Mentor: Roland Jansson
- 2009 **Post-doctoral Research Fellow**, UNM Department of Biology. Projects

	included microsatellite characterization of woodrats (<i>Neotoma</i>) from extremely arid environment in Death Valley National Park in California and collection of paleomidden materials for research on changes in climate and habitat in late Quaternary. Mentors: Felisa A. Smith, Eric Charnov
2008	Seasonal Wildlife Biologist/Naturalist , Great Bear Nature Tours, British Columbia, Canada.
2006-2007	Carnivore/Wildlife Biologist , New Mexico Dept. of Game and Fish, Santa Fe, NM.
2004	Mammal Survey Crew , Gorgas Institute, Panama City, Panama.
2004	Research Assistant (for project in Death Valley Ntl. Park, CA), UNM Department of Biology, Albuquerque, NM.
2002-2004	Carnivore/Wildlife Biologist (on national parks of Colorado Plateau), United States Geological Survey, Arid Lands Field Station, Albuquerque, NM.
2002-2004	Graduate Curatorial Assistant in Mammal Division , Museum of Southwestern Biology, UNM Department of Biology, Albuquerque, NM.
2001	Herpetology Bio-technician , (GS-404-5) USDA Forest Service Rocky Mountain Research Station, Forestry Sciences Lab, Albuquerque, NM.
2000	Insect Biodiversity Survey Crew Leader (Grand Staircase-Escalante National Monument, Utah), BYU Department of Zoology, Provo, UT.
1997-2000	Black Bear Research Crew Member and Leader , BYU Department of Zoology, Provo, UT.
1998	Laboratory Assistant , USDA Forest Service Rocky Mountain Research Station Shrub Sciences Lab, Provo, UT.

PUBLICATIONS

- Harding, L. E.**, F. A. Smith, I. W. Murray, H. M. Lease, and J. T. Martin. Heat, sex and death: the curious tale of a desert mammal. Pages xx-xx in *Natural History of Death Valley and the Mojave Desert* (Steve Rowland, editor), University of California Press, Berkeley, *in press*.
- Smith, F. A., I. W. Murray, **L. E. Harding**, H. M. Lease, and J. Martin. 2014. Life in an extreme environment: a historical perspective on the influence of temperature on the ecology and evolution of woodrats. *Journal of Mammalogy* 95: in press.
- Saarinen, J. J., A. G. Boyer, J. H. Brown, D. P. Costa, S. K. M. Ernest, A. R. Evans, M. Fortelius, J. L. Gittleman, M. J. Hamilton, **L. E. Harding**, K. Lintulaakso, S. K. Lyons, J. G. Okie, R. M. Sibly, P. R. Stephens, J. Theodor, M. D. Uhen, F. A. Smith. 2014. Patterns of maximum body size evolution in Cenozoic land mammals: eco-evolutionary processes and abiotic forcing. *Proceedings of the Royal Society B: Biological Sciences* 281(1784): 20132049.
- Okie, J. G., A. G. Boyer, J. H. Brown, D. P. Costa, S. K. M. Ernest, A. R. Evans, M. Fortelius, J. L. Gittleman, M. J. Hamilton, **L. E. Harding**, K. Lintulaakso, S. K.

- Lyons, J. J. Saarinen, F. A. Smith, P. R. Stephens, J. Theodor, M. D. Uhen, R. M. Sibly. 2013. Effects of allometry, productivity and lifestyle on rates and limits of body size evolution. *Proceedings of the Royal Society B: Biological Sciences* 280(1764): 20131007.
- Jansson, R., G. Rodríguez-Castañedas, and **L. E. Harding**. 2013. What can multiple phylogenies say about the latitudinal diversity gradient? A new look at the tropical conservatism, out of the tropics, and diversification rate hypotheses. *Evolution* 67(6):1741-1755.
- Harding, L. E.**, and J. W. Dragoo. 2012. Out of the tropics: a phylogeographic history of long-tailed weasels (*Mustela frenata*). *Journal of Mammalogy* 93: 1178-1194.
- Rodríguez-Castañeda, G., A. R. Hof, R. Jansson, and **L. E. Harding**. 2012. Predicting the fate of biodiversity using species' distribution models: enhancing model comparability and repeatability. *PLoS ONE* 7(9): e44402.doi:10.1371/journal.pone.0044402.
- Evans, A. R., D. Jones, A. G. Boyer, J. H. Brown, D. P. Costa, S. K. Morgan Ernest, E. M. G. Fitzgerald, M. Fortelius, J. L. Gittleman, M. J. Hamilton, **L. E. Harding**, K. Linutlaakso, S. K. Lyons, J. G. Okie, J. J. Saarinen, R. M. Sibley, F. A. Smith, P. R. Stephens, J. M. Theodor, and M. D. Uhen. 2012. The maximum rate of mammal evolution. *Proceedings of the National Academy of Sciences* 109 (11): 4187-4190.
- Smith, F. A., A. G. Boyer, J. H. Brown, D. P. Costa, T. Dayan, S. K. M. Ernest, A. R. Evans, M. Fortelius, J. L. Gittleman, M. J. Hamilton, **L. E. Harding**, K. Linutlaakso, S. K. Lyons, C. McCain, J. G. Okie, J. J. Saarinen, R. M. Sibley, P. R. Stephens, J. Theodor, and M. D. Uhen. 2010. The evolution of maximum body size of terrestrial mammals. *Science* 330 (6008):1216-1219.
- Harding, L. E.**, and F. A. Smith. 2009. *Mustela* or *Vison*? Evidence for the taxonomic status of the American mink and a distinct biogeographic radiation of American weasels. *Molecular Phylogenetics and Evolution* 52(3):632-642.
- Smith, F.A., D. Crawford, **L. E. Harding**, H.M. Lease, I.W. Murray, A.L. Raniszewski, and K.M. Youberg. 2008. A tale of two species: extirpation and range expansion during the late Quaternary in an extreme environment. *Global and Planetary Change* 65:122-133.
- Auger, J., **L. E. Harding**, H. L. Black, J. D. Heward, and K. D. Bunnell. 2008. Reproduction of black bears on the East Tavaputs Plateau, Utah (*peer reviewed*). In **Harding, L. E.**, and F. S. Winslow (eds), Proceedings of the Ninth Western Black Bear Workshop, Raton, NM. New Mexico Department of Game and Fish, Santa Fe, NM.
- Harding, L. E.** 2008. Out of the Americas: a biogeographical history of the American *Mustela*. Doctoral dissertation at University of New Mexico, Albuquerque, NM.
- Harding, L. E.** 2000. Differential habitat utilization, movement patterns, and behavior of the American Black Bear from hound transects on the East Tavaputs Plateau, UT. Master's thesis at Brigham Young University, Provo, UT.

In review or revision

- Stephens, P. R., A. G. Boyer, J. H. Brown, D. P. Costa, S. K. M. Ernest, A. R. Evans, M. Fortelius, M. J. Hamilton, **L. E. Harding**, K. Lintulaakso, S. K. Lyons, J. K.

- Okie, J. J. Saarinen, R. M. Sibly, F. A. Smith, J. Theodor, M. Uhen and J. L. Gittleman. Understanding the relationship between phylogenetic signal and evolutionary rate: a natural experiment in mammalian body size evolution, *in review*.
- Uhen, M. D., A. G. Boyer, J. H. Brown, D. P. Costa, S. K. M. Ernest, A. R. Evans, M. Fortelius, J. L. Gittleman, M. J. Hamilton, **L. E. Harding**, K. Lintulaakso, S. K. Lyons, J. G. Okie, J. J. Saarinen, R. M. Sibly, F. A. Smith, P. R. Stephens and J. Theodor. The trajectory of marine mammal body mass over the Cenozoic, *in review*.

TECHNICAL REPORTS AND PROCEEDINGS

- Bristow, K. D., **L. E. Harding**, S. R. Boe, M. L. Crabb, and E. S. Rubin. 2013. Pronghorn (*Antilocapra americana*) movements and habitat use in the Big Chino Valley, Arizona. Arizona Game and Fish Department Technical Guidance Bulletin 15, Phoenix, Arizona, USA.
- Harding, L. E.**, and F. S. Winslow (eds). 2008. Proceedings of the Ninth Western Black Bear Workshop, Raton, NM. New Mexico Department of Game and Fish, Santa Fe, NM.
- Harding, L. E.**, and H.L. Black. 2004. Habitat use, behavior, and movements of black bears on the East Tavaputs Plateau, Utah. Pp. 55-64, in Black, H.L. and J. Auger (eds), Black bears of Utah's East Tavaputs Plateau. Final report for the Utah Division of Wildlife Resources. Provo, Utah.
- Bogan, M. A., K. Geluso, and **L. E. Harding**. 2004. Annual report: 2003 Mammalian Inventory for three southern Colorado Plateau Network parks. U.S. Geological Survey, Fort Collins Science Center, Arid Lands Field Station, Department of Biology, University of New Mexico, Albuquerque, NM.

SELECTED PRESENTATIONS

- Harding, L. E.** 2013. When the dead speak. Arizona Game and Fish Department Research Branch 'Science and Sweets' seminar. 9 January 2013.
- Harding, L. E.** 2013. In the footsteps of a wildlife biologist. Presentation at Nina Mason Pulliam Rio Salado Audubon Center, Phoenix, AZ. 16 January 2013.
- Harding, L. E.**, K. Bristow, E. Rubin, S. Boe, and M. Crabb. 2012. Pronghorn habitat modeling in the Big Chino Valley, Arizona. 25th Pronghorn Workshop, Bernalillo, New Mexico.
- Harding, L. E.**, and R. Jansson. 2011. Can stability create change? Exploring the role of stable environments in species diversity. Sixth European Congress of Mammalogy, Paris, France.
- Harding, L. E.** 2011. From molecules to mammoths: diversity in mammals across time and space. Invited department seminar speaker to Department of Biology, BYU, Provo, UT.
- Harding, L. E.**, G. Rodríguez-Castañedas, and R. Jansson. 2011. When the dead speak: using fossils to predict species' distributions in the late Quaternary. Fifth Conference of the International Biogeography Society, Heraklion, Crete.
- Rodríguez-Castañedas, G., **L. E. Harding**, and R. Jansson. 2011. Winners and losers in bird species richness between sister genera: the role of climatic fluctuations and

- persistence in climatically stable areas. Fifth Conference of the International Biogeography Society, Heraklion, Crete.
- Harding, L. E.**, R. Jansson, and G. Rodríguez-Castañedas. 2010. Seeing the forest for the trees: opportunities and problems in understanding the latitudinal diversity gradient using phylogenetic information. Evolution meetings, Portland, Oregon.
- Harding, L. E.**, F. A. Smith, K. M. Youberg, S. K. Lyons, and J. H. Brown. 2009. Globetrotting: patterns of similarity in mammalian distributions across continents. Fourth Biennial Conference of the International Biogeography Society (IBS), Merida, Mexico.
- Smith, F. A., **L. E. Harding**, and I. W. Murray. 2009. Of mice and men: what long dead rats reveal about biotic responses to past environmental change. Plenary talk at North American Paleontological Convention, Cincinnati, Ohio.
- Lease, H. M., **L. E. Harding**, I. W. Murray, J. T. Martin, and F. A. Smith. 2008. Homesteading in Death Valley: Does den quality affect gender, size, and reproductive potential of *Neotoma*? Annual Research Day, Department of Biology, UNM, Albuquerque, NM.
- Harding, L. E.** 2007. Out of the Americas: phylogeography of *Mustela frenata*. 87th Annual meeting of the American Society of Mammalogists (ASM), Albuquerque, NM.

RESEARCH GRANTS AND FUNDING

Arizona Game and Fish Department Habitat Partnership Committee Grant. 2014. Bighorn sheep and mountain lions: a study to better understand their relationships and to help guide management decisions. \$40,000.00.

Arizona Game and Fish Department Habitat Partnership Committee Grant. 2013. Estimating the 2009 black bear population in the Chiricahua Mountains of southeastern Arizona. \$13,125.00.

Theodore Roosevelt Memorial Fund, American Museum of Natural History, New York, NY. “Speciation and biodiversity: phylogeography and population genetics of *Mustela frenata*. L. E. Harding, PI. May 2004, \$2,000.00. Second award, April 2005, \$1,640.00.

American Society of Mammalogists Grants-in-Aid of Research. “Speciation and biodiversity: phylogeography and population genetics of *Mustela frenata*. L. E. Harding, PI. April 2003, \$1,500.00. Second award, April 2004, \$1,500.00.

Graduate Research and Development, UNM: “Speciation and Biodiversity: Phylogeography and population genetics of *Mustela frenata*.” L. E. Harding, PI. November 2003, \$1,500.00. Second award, November 2004, \$1,800.00. Third award, November 2005, \$1,000.00.

Graduate Research Allocations Committee, UNM Biology. “Speciation and Biodiversity: Phylogeography and population genetics of *Mustela frenata*.” L. E. Harding, PI. April 2003, \$300.00. Second award, November 2003, \$250.00. Third award, March 2005, \$300.00.

Student Research Allocations Committee, Graduate and Professional Student Association, UNM. “Genetic forces driving speciation and biodiversity in long-tailed weasels.” L. E. Harding, PI. May 2003, \$500.00. Second award, May 2005, \$500.00.

TEACHING EXPERIENCE

- 2012 **Full-time Faculty (Lecturer)**, Department of Zoology and Physiology, University of Wyoming at Casper College
Zoology 4370 Mammalogy
Life 3500 Evolutionary Biology
- 2009 **Part-time Faculty**, Department of Biology, University of New Mexico.
Biology 386 General Vertebrate Zoology
- 2000-2008 **Graduate Teaching Assistant**, Department of Biology, University of New Mexico.
- Courses Taught:**
- Biology 121 Principles of Biology I
Biology 122 Principles of Biology II
Biology 124 Biology for Health Sciences
Biology 204 Plant and Animal Form and Function
Biology 489 Mammalogy
- 1997-2000 **Undergraduate/Graduate Teaching Assistant**, Department of Zoology, Brigham Young University.
- Courses Taught:**
- Biology 110 Principles of Biology
Zoology 344 Natural history of vertebrates
Zoology 351 Ecology (animal emphasis)
Botany 351 Ecology (plant emphasis)
- 1997-1998 **Writing Fellow and Head Fellow, BYU General and Honors Education.** Mentored student scientific and creative writing in Natural Sciences Colloquium, History and Philosophy of Biology, and History of Civilization courses at BYU.

HONORS AND AWARDS

- 2004 Alvin R. and Caroline G. Grove Doctoral Scholarship. UNM Biology Department, \$7,300.00.
- 1999 Clarence Cottom award for excellence in Conservation Biology. BYU Zoology Department, \$1,000.00.